Course Introduction

Econ 7800 is a two-week refresher course on mathematical tools that are pervasively used in economics and is designed to prepare Ph.D. students for studying advanced level courses in microeconomics, macroeconomics, and econometrics. Besides lectures, practice problems will be suggested, but they will not be graded. A study room is being arranged where students can work on practice problems individually or in groups in the afternoon. The course grade will be determined from the final examination that will be given on August 23 during regular class hours.

Tentative Course Schedule

1. Solving Simultaneous Equations Models and Comparative Static: Aug 13,14
   a. Repeated Substitution Method
   b. Matrix Algebra Method: basic matrix operations, calculating determinants, inverses, Cramer's rule, characteristic roots and vectors
1. Differential Calculus: Aug 15
   a. Concept of Limit, Differentiability, Continuity, Monotonicity, Rules of Differentiation and Partial Derivatives
   b. Total Differential, Implicit Function Theorem
   c. Taylor Series Expansion of a Polynomial Function
   d. Homogeneity, Homotheticity, Euler's Theorem
1. Unconstrained Optimization Technique: Aug 16
   a. Stationary Point, Extreme Value, Convexity/Concavity
   b. First Order and Second Order Conditions for Extreme Value
1. Constrained Optimization Technique: Aug 17,20
   a. Equality Constrained Optimization: Substitution Method, Lagrange Multiplier Method
   b. Inequality Constrained Optimization: Kuhn-Tucker Conditions
1. Difference and Differential Equations and Basic Probability Theory: Aug 21,22
2. Final Examination: Aug 23